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EPA Region 5 Records Ctr.



225799

December 2, 1993

Ms. Verneta Simon  
USEPA  
77 W. Jackson Blvd.  
HSE-5J  
Chicago, IL 60604

RE: Relevant STS Consultants Experience Regarding Potential Remedial Investigation of the Former Lindsay Light Site, Chicago, Illinois

Dear Ms. Simon:

In response to our recent discussion regarding the above-referenced site, attached please find information regarding relevant STS capabilities and experience for the proposed investigation. You had requested we provide information describing STS' experience on similar projects. We have included descriptions of several projects involving subsurface exploration and sampling of low level radioactive materials.

We have also included descriptions of our drilling, sampling and other technical support capabilities. We propose to offer some suggested revisions to the draft work plan which has already been prepared. These suggested revisions would be proposed in an effort to minimize the potential generation of contaminated materials as part of the sampling and exploration effort.

Finally, we have included resumés of personnel from STS whom we propose for involvement in this project. We will also provide statements of qualifications for our proposed subcontractors upon concurrence from our client, the Chicago Dock and Canal Trust. At present, the only services we are proposing to subcontract are analytical services and health physicist.

We look forward to working with you on this project. Please contact us with any further questions you may have regarding this information.

Regards,

STS CONSULTANTS, LTD.

Richard G. Berggreen  
Principal Geologist

Douglas J. Hermann, P.E.  
Principal Engineer

DJH:AR5:seb

encl.

**STS Consultants Ltd.**  
Consulting Engineers

111 Pfingsten Road  
Northbrook, Illinois 60062  
708.272.6520/Fax 708.498.2721



## **Confidential Client**

### ***Assessment of Hazardous Solid Waste Storage Risk***

A nuclear fuel processing plant had treated low level radioactive waste by solidification and storage in steel drums. After a short period of time a number of the drums showed a substantial degree of swelling, and in view of the nature of the contents, the owners asked STS to determine the nature and condition of the contents prior to opening the drums.

Using a combination of dynamic and mechanical tests, STS was able to prove that the waste had not reliquified, and there was a very low risk of gas pressure build-up in the drums. The drums were then successfully opened with no spillage or gas release, confirming STS' analysis that the swelling was caused by uneven expansion of the solidification agent, probably caused by incomplete mixing.

## **Fermi National Laboratory**

### ***Tritium Contaminated Water Sampling Batavia, Illinois***

STS participated in the design, installation and sampling of a series of groundwater monitoring wells to explore for a potential release of tritium-enriched water at Fermi National Laboratory. The wells were installed at an angle, to facilitate sampling of a drainage system beneath the radiation source which had been installed to collect and contain any releases which might occur. Precise location and alignment specifications were required and complied with. Drilling methods required that no water be introduced, in order to minimize the potential dilution of the tritiated water which may have been present, and to constrain any migration. All equipment used was monitored for potential radiation contamination and was decontaminated before removal from the site. Samples were collected by STS personnel using dedicated sampling equipment to avoid potential cross contamination. Analysis was conducted at a subcontracted laboratory selected by Fermi Lab representatives.

## **Kerr-McGee Corporation**

### ***Radioactive Contamination Assessment West Chicago, Illinois***

STS was retained for a hydrogeological assessment of the firm's West Chicago processing facility. Contamination of a down-gradient municipal well prompted officials to institute a source evaluation for the contamination. STS' scope of services included a remedial investigation of the site. The facility which was formerly used as a uranium processing plant contained numerous waste tailing piles which were determined to be leaching low level radionuclides and volatile organic compounds into the groundwater. The investigation scope included the installation of over 40 stainless steel groundwater monitoring wells to determine groundwater flow direction and horizontal and vertical gradients. STS conducted extensive sampling to determine levels of contamination for contaminants. STS performed over 1220 soil borings for soil sampling and chemical analysis to define the extent of near surface and deep aquifer contamination. STS also conducted an extensive geophysical exploration program including resistivity soundings and profiling, electromagnetic inductance and ground penetrating radar surveys. STS performed extensive groundwater flow and solute transport modeling to predict steady state contamination transport using a variety of scenarios. STS' modeling indicated that the leaching of the waste tailings had contaminated the underlying groundwater table. The contaminants had migrated over time to the groundwater supplies of the down-gradient municipalities. STS crews worked under an exhaustive health and safety program developed by STS and Kerr-McGee.

## **Institute of Paper Science and Technology**

### ***Appleton, Wisconsin***

STS conducted a subsurface exploration for the recovery of previously disposed radioactive tracer chemicals. Small quantities of Promethium-147, Silver-110, Carbon-14 and Tritium were disposed at the IPST facility in 1979. STS was contracted to locate and remove the materials which were reportedly disposed of in a container.

STS conducted a series of site surveys including Electromagnetic(EM), Ground Penetrating Radar(GPR) and a radiation survey using a Geiger-Mueller Radiation Survey Meter. Subsequent exploration included test pit trenching of identified target areas.

The materials disposed were reportedly exempt from regulation due to the small quantities, and were proposed to be removed as part of a real estate sale under consideration.

## RELATED PROJECT EXPERIENCE

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### **Federal Cartridge Company** *Remedial Investigation Twin City, Minnesota*

STS was retained by Federal Cartridge Company and USATHAMA to perform a remedial investigation at the 2,300-acre Twin City AAP. The site is the most publicized groundwater contamination site in Minnesota with 168 potential contamination sources. STS services included installation of groundwater monitoring wells to determine groundwater flow direction, sampling, and analyses of groundwater and soils, and geophysical explorations of the site including extensive shallow soil gas analyses. In addition, STS performed groundwater flow and transport modeling to predict contaminant transport under various remediation scenarios. The work scope also involved assistance in the design of remediation alternatives. The resulting remedial measures have included placement of barrier wells and treatment of groundwater by air stripping and recharge through an infiltration basin.

### **Weyerhaeuser Company** *Mid-State Disposal Site Superfund Project Stratford, Wisconsin*

STS provided remedial investigation and corrective action services for the 30-acre Mid-State Disposal corrective action site. The major elements of the selected remedy included: installation of state-of-the-art landfill covers on a 20-acre and a 5-acre landfill; installation of an innovative cover design on a 3-acre sludge lagoon; site monitoring, including groundwater, surface water, and gas monitoring; alternate water supply; surface water discharge control; installation of institutional controls, including on-site road construction and fencing; off-site leachate treatment; and installation of an active gas flaring system. STS completed and implemented a pre-design work study which consisted of landfill cover evaluations, installation of groundwater monitoring wells, collection of additional groundwater quality and hydrogeologic data, and review of alternate water supply system applications and locations. Following the study, STS prepared a pre-design report summarizing the data and an RD/RA work plan. STS worked closely with the regulatory personnel on this project to minimize work efforts and costs where possible.

### Requisite Resources

STS Consultants, Ltd. (STS) is a specialized, multi-disciplined engineering firm offering an integrated package of services. Founded in 1948, STS has conducted more than 100,000 projects throughout the Chicago area, nationwide and overseas. STS is organized along an area of practice philosophy. Our four areas of practice are Geotechnical Engineering, Environmental Sciences, Water Resources, and Construction Technology. The investigation of the Lindsay Light site would be directed out of the Environmental Sciences Section of the Northbrook, Illinois office. The following section provides an overview of our various engineering capabilities. Resumés of employees who could be called on to provide support to this project are also provided.

STS owns sampling equipment and hydraulic conductivity testing equipment which we would like to propose for use on this project. However, specific equipment requirements would be evaluated following preparation of the Health and Safety Plan. STS also owns and operates the geotechnical lab at which soil physical characteristics (grain size distribution, hydraulic conductivity and total porosity) would be analyzed. STS' geotechnical lab is accredited by the U.S. Army Corp of Engineers, the Indiana Department of Transportation, and the National Voluntary Accreditation Program (NVLAP). In addition, STS has performed subcontract geotechnical analyses for several regulatory agencies including the Illinois Environmental Protection Agency (IEPA).

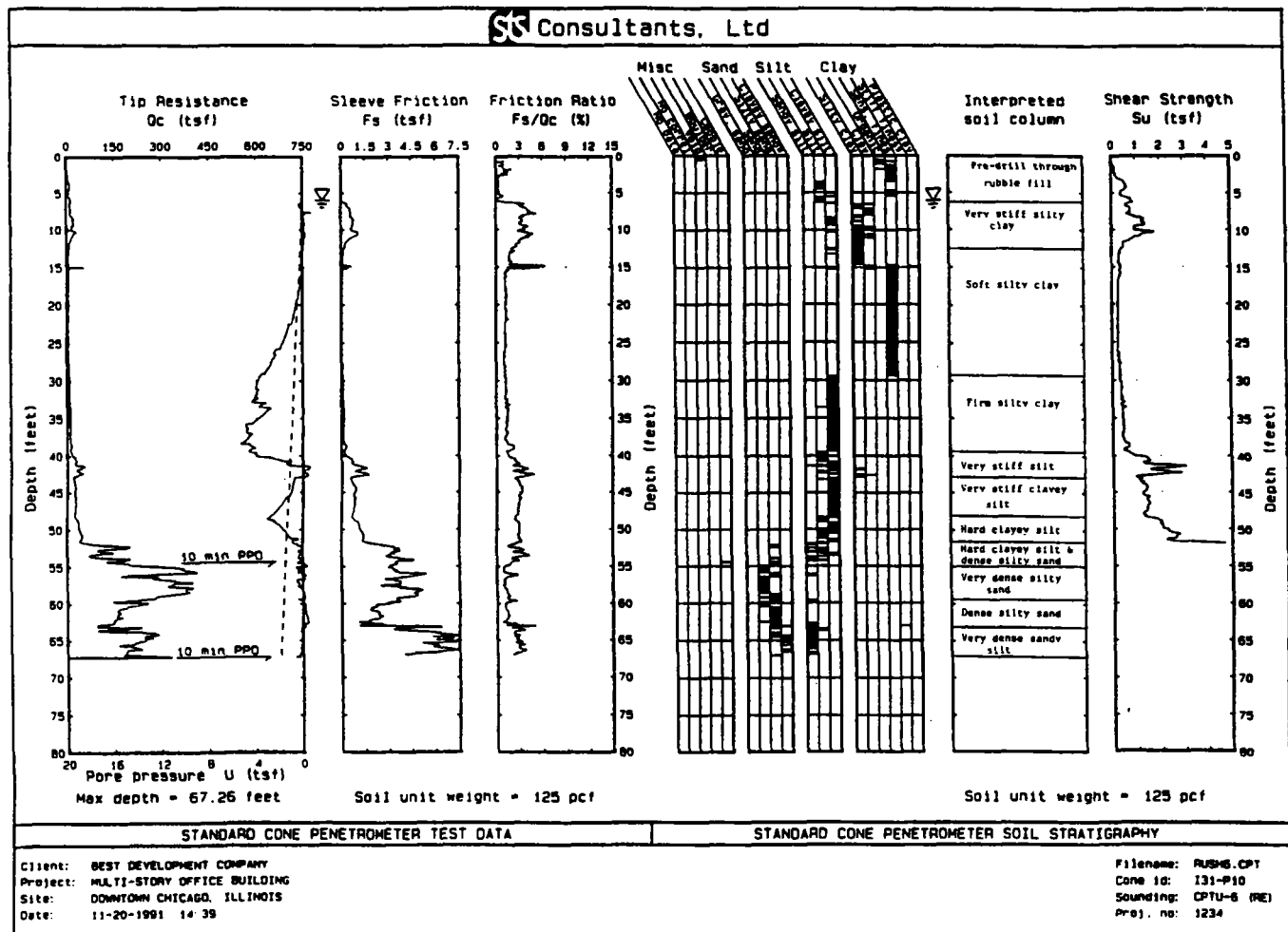
A significant portion of the field work will consist of soil and groundwater sampling of potentially radioactive contaminated materials. The ability to sample while generating a minimum amount of waste material may be of considerable concern during the field effort. STS Consultants is the only Midwestern geo-environmental engineering firm which offers its own state-of-the-art in-house Cone Penetration Test (CPT) capabilities. A brief discussion of these capabilities is provided on the subsequent page.

# CONE PENETRATION TESTING



The Electric Cone Penetration Test (CPT) is performed by pushing a high strength cone-tipped rod into the ground from a specially designed mobile truck laboratory. Electric strain gauges built into the cone tip measure the subsurface soil strength, soil stratigraphy, and groundwater pressure continuously with depth.

Data from the CPT is automatically recorded for every inch of soil penetrated by a PC computer which also interprets the information and provides real-time "boring logs" to the field engineers. The cone provides a much more detailed description of subsurface conditions than conventional methods which rely on soil samples taken every few feet.



- Production averages 300 to 400 feet per day. Thus, 3 to 4 times as much data can be collected for the same cost as conventional drilling.
- CPT data reduction is much more efficient than for conventional drilling and sampling. Critical soil parameters are measured in-situ. The need for lab testing and office drafting is greatly reduced.
- The CPT rig is fully enclosed for all weather testing, and the operator does not come in contact with the soil. At environmental sites, our self-grouting cone can seal the small diameter test holes as the cone is withdrawn.
- Since the CPT is continuous, it is possible to detect layers of problem soil as thin as one or two inches. Detection of these layers can be critical for stability and environmental issues.
- The results are accurate and reproducible because the operator influence is largely removed from the test procedure.
- Special probes are available to sample soil vapor or groundwater directly through the cone.
- New probes that can measure soil resistivity and temperature at environmental sites are under development.

Additional technical resources that STS has at its disposal are described below.

#### Environmental Field Survey Capabilities

STS has state-of-the-art techniques for field chemical analysis. STS currently operates a trailer-portable gas chromatograph system that can be used to provide real time monitoring of site conditions such as sediment contamination or water quality relative to VOCs. STS is one of the U.S. Corps of Engineers' approved contractors for the field survey delineation of wetlands and conduct of functional value surveys of wetland resources.

#### Geophysical Survey Capabilities

STS maintains equipment and trained personnel to conduct several types of geophysical surveys including electromagnetic, electrical resistivity, thermography, ground probing radar and seismic refraction.

#### Subsurface Exploration Capabilities

STS maintains a modern fleet of track and truck-mounted rotary and auger drill rigs that are capable of drilling and sampling in a variety of geologic formations. The rigs are accompanied by highly trained personnel experienced with the specialized drilling and sampling protocol required at hazardous waste sites. STS has extensive experience with sophisticated sampling and in-situ testing devices including angle drilling, monitoring well and piezometer installation, lysimeters, slope indicators, vane shear, and pressuremeter.

#### Laboratory Facility

STS' main laboratory is located in Northbrook, Illinois. The laboratory is extensively equipped for classification and physical property testing of soil and construction materials. Specialized equipment and testing includes triaxial strength and permeability of soils and geosynthetics testing.

### Library Resources

STS maintains its own technical library to serve the company's information needs. The GEODEX Index System is utilized for referencing all geotechnical and geological related publications. STS is a member firm of NWWA and retrieves groundwater data from the National Groundwater Information Center Database. STS is also a subscriber to a number of other technical and environmental related databases.



**RICHARD G. BERGGREEN**

**Principal Geologist**

## EDUCATION

M.S. Geology, San Diego State University

B.S. Geology, Occidental College, Los Angeles

Graduate Studies, Geology, UCLA

## REGISTRATION

Registered Geologist: California

Certified Professional Geologist: Indiana

## PROFESSIONAL ACTIVITIES

Association of Engineering Geologists

Sigma XI

## EXPERIENCE

Principal Geologist and Group Manager for the Environmental Assessment and Remediation Group. Responsible for environmental and hazardous waste evaluations including municipal and hazardous waste landfill investigations, groundwater monitoring programs at industrial facilities, and remedial investigations at controlled and uncontrolled waste disposal sites. Previous experience includes 11 years with Woodward-Clyde Consultants.

Representative project experience includes the following:

- Principal in charge of assessment and closure of USTs at more than 40 sites for an Illinois utility. Included supervision of tank removal contractor, field sampling, subcontractor laboratory logistics, closure report preparation, and application for LUST Trust Fund reimbursement.
- Supervised groundwater exploration program and design of first site to qualify under Illinois LUST TRUST fund. Included design of monitoring well system, recovery well and water treatment system.

- Project Manager and Principal in charge of removal, closure, and remediation of more than 100 UST sites including retail service stations removing and upgrading USTs; industrial sites involving hazardous materials ASTs and USTs, fuel oil USTs and motor vehicle fuel USTs; warehouse and commercial facilities removing USTs; and USTs encountered in the course of site development which require removal and soil/groundwater remediation.

- Managed preparation of geologic, hydrogeologic and geotechnical reports at operating hazardous waste and municipal waste co-disposal facilities in Cook and Will Counties for state permit applications and USEPA Part B permit applications. Supervised the field installation and sampling of monitor well networks at site expansions and proposed sites in northeastern Illinois.

- Principal in charge of soil and groundwater investigation of a pharmaceutical chemical manufacturing plant involving more than 700 soil borings, 40 monitoring wells and hydrologic assessments in site conditions in response to an administrative consent order. Included management of STS personnel, subcontract personnel, coordination with client representatives and meetings with state agency representatives.

- Project Manager on an evaluation of groundwater contamination at a creosote wood-treating plant in Illinois. Included computer modeling of groundwater migration, assessment of contaminant migration rates, both vertically and horizontally, and potential contaminant retardation due to organic carbon partitioning in the site soils.

- Project Manager on hydrogeologic and permitting studies for six wood-treating facilities throughout the eastern United States. Included aquifer assessments through tracer studies and pump tests; contamination assessments of soils, groundwater and surface water; and RI/FS programs to provide recommendations on site remediation.

- Prepared annual RCRA groundwater monitoring reports for several facilities, including a lead processing plant hazardous waste landfill and a sulfuric acid disposal pond in Missouri.

- Project Geologist on an evaluation of a hazardous waste site with potential leakage into a developed aquifer in south central Kansas. Participated in the assessment and remedial measures design and installation.

- Project Manager and coordinator of the preparation of land use and land cover maps for more than 400 square miles of densely developed Cook County, Illinois. The maps were prepared on the basis of aerial photographic interpretation, topographic map assessments, and correlation with Cook County zoning maps.

- Project Geologist on a U.S. Army Corps of Engineers project of safety inspections for more than 65 dams in southeastern Missouri. These dams included both earthen and mine tailings dams and all had been classified as high hazard dams. Responsibilities included coordination of scheduling, field support services, liaison with the Corps of Engineers, geologic field explorations and report preparation.



- Worked on fault studies for critical structures such as hospitals, dams and nuclear reactor foundations, feasibility studies for underground storage of compressed air, environmental impacts of the siting of a large missile complex, and siting studies for liquified natural gas import terminals. The fault studies involved aerial photograph analysis, field mapping, trench logging and petrographic analysis of fault zones in Washington State, central and southern California, Argentina and Mexico. Involved evaluation of such hazards as on-site faulting, coastal and fluvial erosion, and slope stability. Participated in extensive aerial photograph reconnaissance in southeastern Alaska to evaluate fault potential for the Alaska-Canada pipeline.

- Project Manager on an evaluation of construction resources, specifically construction grade sand and gravel, in California. Included evaluation of the potential resources in alluvial sediments, sedimentary rock formations, and crystalline bedrock units.

- Project Manager and supervisor of the geophysical surveying of more than 40 miles of flood control levees along the Illinois River in Central Illinois. The surveys were performed to identify potential sites for exploration of under-seepage problems due to permeable construction materials.

- Managed Phase I and Phase II environmental assessments for property transfers or refinancing on commercial and industrial real estate nationwide including properties in CA, DE, FL, IL, IN, LA, ME, MA, MN, MI, MO, OH, TN, TX, VA, and WI.

#### PUBLICATIONS

"Polynuclear Aromatic Hydrocarbon Contamination in Downtown Chicago Fill Soils," Proceedings of the Association of Engineering Geologists Annual Meeting, Chicago, Illinois, co-authored, 1991.

"Characterization of Hydrogeology and Groundwater Contamination at a Creosote Wood Treating Plant in Southern Illinois," Annual Meeting Association of Engineering Geologists, Winston-Salem, North Carolina, 1985.

"Hydrogeologic Model of a Hazardous Waste Site, South-Central Kansas," International Association of Engineering Geologists International Symposium, Management of Hazardous Chemical Waste Sites, Winston-Salem, North Carolina, co-authored, 1985.

"In-Situ Measurement of Hydraulic Conductivity and Recharge through Wisconsinan Age Till, Northeastern Illinois," Annual Meeting Geological Society of America, Reno, Nevada, 1984.

"Recent Landslides in San Onofre Bluffs State Park," South Coast Geological Society Guidebook, Oct. 20, 1979 Field Trip, Guidebook to Selected Geologic Features Coastal Areas of Southern Orange and Northern San Diego Counties, California, 1979.

"Recency of Faulting on the Mount Soledad Branch of the Rose Canyon Fault Zone in Northwestern Metropolitan San Diego," Annual Meeting Geological Society of America, San Diego, California, co-authored, 1979.

"Geology of the Proposed Camp Pendleton LNG Site, San Diego, California," American Association of Petroleum Geologist Guidebook No. 46, Geologic Guidebook of San Onofre Nuclear Generating Station and adjacent regions of southern California, 1979.

"Sandstones Cemented by a Relict Phyllosilicate, San Diego, California," Transactions of the San Diego Society of Natural History, Vol 18, No. 15, co-authored, 1977.

"Petrography and Metamorphism of the Morena Reservoir Roof Pendant, Southern California," California Division of Mines and Geology Special Report 129, co-authored, 1976.

"Petrography, Structure and Metamorphic History of a Metasedimentary Roof Pendant in the Peninsular Ranges, San Diego County, California," Cordilleran Section Annual Meeting, Geological Society of America, Pullman, Washington, co-authored, 1976.

**DOUGLAS J. HERMANN**

Vice President

## EDUCATION

M.S.C.E., Purdue University

B.S.C.E., Valparaiso University

## REGISTRATION

Professional Engineer: Wisconsin, Michigan, Oklahoma, Louisiana, New Jersey

## PROFESSIONAL ACTIVITIES

American Society of Civil Engineers

National Solid Waste Management Association

Solid Waste Association of North America

Illinois Groundwater Association

National Water Well Association

Technical Association with Pulp & Paper Industry

American Foundryman's Society

Tau Beta Pi

## EXPERIENCE

Principal coordinator of the Environmental Group including project and staff management. Recent experience and project involvement includes the following:

- Project Manager for \$1.0 million landfill design for the Hackensack Meadowlands Development Commission, New Jersey, which included refuse slope stability, surface drainage, a 20,000 lineal foot bentonite slurry cutoff trench, and end use landscaping design. Landfill capacity is approximately 49 million cubic yards.

- Project Manager for solid waste management plan conducted for International Paper Company in Pineville, Louisiana. Included the technical and economic aspects of various solid waste management alternatives including plan for landfill disposal, agricultural and silvicultural soil amendments and recycling. A hydrogeologic study was conducted on five existing impoundments with a new landfill design and impoundment redesign. Permits and plans and specifications prepared.

- Project Manager for eight studies to evaluate the economic and technical aspects of landspreading waste water sludges from the pulp and paper industry as soil amendments, included chemical and physical characteristics of the sludge, pretreatment requirements and loading rates based on nutrient availability including nitrogen mineralization testing.

- Project Manager for a ground water remediation program to remove and treat arsenic contaminated ground water. Included a groundwater gradient control trench and the pumping program. Clean up effort was completed and approved by the regulatory agency.

- Project Manager for several landfill site permits in Wisconsin, Michigan, Illinois, Oklahoma, Louisiana and New Jersey which included a hydrogeology study, landfill design, closure design, leachate management, gas management and financial and business planning.

- Project Manager for several groundwater remediation projects aimed at oil, gasoline, solvents, heavy metals, pesticides, herbicides, and PCB's.

- Project Manager for several gas recovery and gas venting projects for combustible landfill gases which were controlled with engineering design features.

- Project Engineer to evaluate the compatibility of commercial bentonite sealants with various leachate characteristics. Laboratory work developed a standard study technique for bentonite/waste compatibility.

- Project Engineer for design of a quality control program for a sand-bentonite impoundment liner prepared by batch mixing materials and controlling the liner product to project specifications.

- Project Manager for \$2.0 million Gallatin National sanitary landfill/landfill design and siting activities. Provided expert testimony for local siting hearing. Local siting approval was granted in 1989 and IEPA permit in 1991.

- Project Engineer for an industry survey and design of a double geomembrane liner in a sand environment. Included plans, specifications and a quality control program for liner installation.

- Project Engineer for re-analysis of the Mohawk Dam on the Walhonding River, Ohio. Included slope stability analysis, and 3-dimensional finite element seepage analysis calibrated against 150 piezometers to redesign passive pressure relief wells at the toe of a 110-foot high flood control dam.

- Project Engineer for the preliminary ventilator shaft design and construction recommendations for an underground mine. The freezing technique was recommended.

- Project Engineer for development of a composting process design for two waste water sludges from the pulp and paper industry. Included windrow and aerated static pile designs with other mill wastes used as bulking agents with the waste water sludges. Permits were obtained for a full scale operating facility with a surface water containment area.

#### PUBLICATIONS

"Beneficial Reuse Opportunities for Foundry Sand," American Foundryman's Society, Environmental Affairs Conference, Dearborn, Michigan, 1992.

"Regional Solid Waste Management Using Railroad Transportation," Minnesota Pollution Control Agency Solid Waste Conference, Minneapolis, Minnesota, 1992.

"SB172 Siting Experiences from a Regional Pollution Control Facility in Illinois," Illinois Groundwater Association, Starved Rock, Illinois, 1990.

"Geotechnical Landfill Design," Presented at the Illinois Institute of Technology, Chicago, Illinois, Spring, 1990.

"Case History - Leaking Underground Gasoline Tank and Vapor Problems," 79th Annual Air Pollution Control Association, Minneapolis, 1986.

"Effect of Acidic Leachate on Clay Permeability," Eighth Annual Madison Waste Conference, University of Wisconsin Extension, September, 1985.

"Landfill Hydrogeologic Investigations," Sanitary Landfill Design Course, University of Wisconsin Extension, February, 1983 and 1984.

"Considerations for Using Waste Water Sludge as an Agricultural and Silvicultural Amendment," Paper Sludge Symposium, University of Maine Extension, October, 1982.

"Prospects for Land Application of Waste Water Sludges from the Paper Industry," TAPPI Conference, Minneapolis, Minnesota, April, 1982.

"An Overview of Solid-Waste Disposal Practices of Wisconsin Papermakers," Paper Trade Journal, April, 1982.

"Performance Studies of Various Landfill and Impoundment Liners," Fourth Annual Conference of Applied Research & Practice on Municipal & Industrial Waste, Madison, Wisconsin, 1981.

"Land Application of Pulp & Paper Industry Solid Wastes," National Council for Air & Stream Improvement, Lake States Region, Chicago, Illinois, 1980.

"Field and Laboratory Study of Water Movement Through Bark," First Annual Conference of Applied Research and Practice of Municipal and Industrial Waste, Madison, Wisconsin, 1978.

"Alum Mud Disposal Site-Two Case Histories," National ASCE Conference, Chicago, Illinois, 1978.



**KATHRYN R. HUIBREGTSE**

Principal Engineer

## EDUCATION

B.S., Chemical Engineering, University of Wisconsin, Madison

## REGISTRATION

Professional Engineer: Wisconsin

## PROFESSIONAL ACTIVITIES

American Institute of Chemical Engineers

Federation of Environmental Technologists

Visiting Committee-Civil Engineering Department, University of Wisconsin, Madison

## EXPERIENCE

Provides chemical engineering expertise on environmental projects related to handling hazardous waste and spills. Recommends and assesses treatment options, evaluates extent of contamination and performs endangerment assessments. Recent project experience includes:

- Process design and cost-effective evaluation of ground water treatment systems for gasoline and solvent contaminated aquifers at several sites.
- Preliminary design of municipal waste landfill leachate treatment system including biological and physical chemical treatment components.
- Review of RI/FS documents and development of pre-design work plan for abandoned waste disposal site in central Wisconsin.
- Evaluation of the extent of contamination for Ohio Superfund sites. Contaminants evaluated included VOC's, PAH compounds and metals. Treatment technologies and alternatives were assessed in this RI/FS effort.

- Preparation of endangerment assessments for several RI reports. Exposure routes included ingestion of water, soil and inhalation. Both human health and environmental endangerment were evaluated.

- Performance of environmental compliance audits for a small parts manufacturer with multiple plant operations.

- Establishment of an optimum waste handling and reduction procedure as well as coordinating sample analyses and providing regulatory liaison for a small metal parts manufacturer.

- Performance of lab scale treatability tests on a sulfide containing leachate to establish optimum treatment methods prior to sewer discharge and to recommend an on-site pretreatment system.

- Coordination of a chemical testing program for an abandoned container reclamation and storage site. The project involved site history evaluation, on-site testing, and a preliminary review of remedial action options.

- Principal Investigator for two EPA contracts (68-03-2508 and 68-03-2696) involving development of a mobile system for treatment of spills on soil. This work involved laboratory and pile tests, feasibility evaluation, design and construction.

- Technical coordinator for U.S. Army project DAAG-53-76-C-0082 which involved a column study to establish the feasibility of landfill disposal for nitrocellulose lime sludge.

- Project manager for a U.S. Army study to evaluate contaminant leaching from soils at the Rocky Mountain Arsenal.

- Under EPA Contract 68-01-3973, evaluated the applicability of existing spill response systems for handling hazardous waste spills. Major author and coordinator of the "Manual for Control of Hazardous Materials Spill" written under EPA Contract 68-03-2214. Helped complete a film based on the unit processes presented in the manual.

- Major author of the "Handbook for Sampling and Sample Preservation of Water and Wastewater," (EPA Contract 68-03-2075), and "Combined Sewer Overflow Sludge Impact Assessment" (EPA Contract 68-03-0242). Aided in preparation of the EPA report entitled, "Methodology for the Study of Urban Storm Generated Pollution and Control," under Contract 68-03-0335.

- Industrial experience has included management of both water conservation and pollution abatement projects for a large automotive manufacturer. Tasks included initial surveys, sampling and flow measurement, development and cost effectiveness of evaluation of alternatives, design and preparation of plans and specifications.

## PUBLICATIONS

"Soil Chemical Concerns in Hazardous Waste Siting," prepared for the National Conference on Environmental Engineering, ASCE, July 8-10, 1980, co-authored.

"Development of a System to Protect Groundwater Threatened by Hazardous Spills on Land," (Draft Report), EPA Contract No. 68-03-2508, July, 1979, co-authored.

"Evaluation of Secondary Environmental Impacts of Urban Runoff Pollution Control," Contract No. 68-03-2574, EPA, MERL, Cincinnati, Ohio, 1979.

"Development of a Recommended System for Determining NPDES Method Equivalency," (In Press), EPA Contract 68-03-2595, 1979.

"Handling and Disposal of Sludges from Combined Sewer Overflow Treatment: Impact Assessment," EPA Report No. EPA-600/2-77-053b, 1979.

"Feasibility Study Regarding Landfill of Nitrocellulose Lime Sludge and Oxidation of Nitroglycerin Wastewater Stream," US AMERDCOM Contract DAAG 53-76-C-0082, 1978.

"Development of an Emergency Response Program for Transportation of Hazardous Waste," Solid Waste Management Series Report SW-171C, March, 1978, co-authored.

"Manual for Control of Hazardous Materials Spills," EPA Report No. EPA-600/2-77-277, November, 1977, co-authored.

"Handbook for Sampling and Sample Preservation of Water and Wastewater," EPA Report No. EPA-600/4-76-049, September, 1976, co-authored.

"Engineering Report for Elimination of Three In-Plant Oil sources," AMC Corp, June, 1976, co-authored.

"Preliminary Engineering Report for Water Management Procedures," AMC Corp, May, 1976, co-authored.

"Final Report on Water Pollution Abatement Study," ACM Corp, January, 1975.



**JEANNE M. TARVIN**

Associate

## EDUCATION

B.S. Engineering Geophysics, Michigan Technological University

Graduate Studies in Environmental Engineering, University of Wisconsin, Milwaukee

## CERTIFICATION

Certified Professional Geologist

## PROFESSIONAL ACTIVITIES

American Institute of Professional Geologists

Society of Exploration Geophysics

National Water Well Association

## EXPERIENCE

Responsible for managing projects with the Environmental Group. Senior Project Geologist for various hydrogeologic studies, environmental assessments, landfill studies, and groundwater contamination assessments.

A representative sampling of project experience includes:

- Project Manager for multi-million dollar Superfund project in Central Wisconsin. Directly responsible for project scheduling and budgeting, development of project work plans, technical direction of field and laboratory testing, regulatory liaison, and preparation and review of technical work plans and reports.

- Preparation of siting studies, feasibility studies, hydrogeologic studies, and facility designs for industrial and municipal landfills, including permitting and repermitting of hazardous and non-hazardous waste landfills.

- Preparation of plans, specifications, site safety plans and construction management for closure of hazardous waste facilities.

- Management of underground storage tank facilities including site assessments, corrosion analysis, design of tank installations, tank abandonment and closure documentation, regulatory compliance and remedial action.

- Conducted azimuthal resistivity surveys and geologic mapping at two landfill sites in Wisconsin to delineate bedrock fracture orientation as an aid in designing groundwater monitoring systems and locating leachate and gradient control pipes.

- Performed numerous environmental assessments for property transfer including preparation of work plans for soil and groundwater sampling, soil gas surveying, interpretation of chemical analysis, development of remedial action plans and final report preparation.

- Completed electromagnetic surveys to determine the location of suspected leachate leaks in a clay lined dike around the perimeter of lime mud lagoons, to delineate the horizontal and vertical extent of groundwater contamination at various sites and to locate abandoned refuse areas as potential sources of contamination.

- Engineered, designed, and conducted monitoring program using downhole resistivity probes to monitor the boundary between an existing and new industrial landfill.

- Performed a downhole seismic survey to determine integrity and quality of concrete caissons during construction of an underground parking facility.

- Geophysical surveys including seismic refraction, thermography, electromagnetics, electrical resistivity, downhole bore logging, and subsurface interface radar for contamination assessments; development of groundwater monitoring plans, hydrogeologic analysis and engineering design of drilling activities for major exploration programs.

**CRAIG S. RAWLINSON**

**Senior Hydrogeologist**

## EDUCATION

M.S. Engineering Geology, University of Akron

B.S. Geology, Ohio State University

## CERTIFICATION

OSHA 1910.120 Hazardous Waste Training- to level B

## PROFESSIONAL ACTIVITIES

National Water Well Association

The Solid Waste Association of North America, Land of Lincoln Chapter - Director

Illinois Groundwater Association

## EXPERIENCE

Responsible for the geologic and hydrogeologic data acquisition and interpretation for a wide variety of projects including: site assessment investigations, geophysical investigations and groundwater contamination and remediation projects. Recent project experience includes the following:

• Project Manager for hydrogeological investigations associated with the siting and permitting of a 100 acre landfill expansion in Northcentral Illinois. The investigation included a detailed assessment of the hydrostratigraphic flow regime associated with Pennsylvanian Age cyclothem deposits and geotechnical analysis of soil and rock samples for hydraulic and engineering construction properties. Also provided expert witness testimony at the siting hearing.

• Project Geophysicist for a landfill characterization investigation of a municipal solid waste landfill located in south central Wisconsin. The scope of the investigation included the downhole geophysical logging of six leachate head wells to determine internal structure and to assess leachate head levels within the landfill.

• Project Hydrogeologist for the review of the Fulton County sanitary landfill expansion evaluation. Work included an assessment of hydraulic and geochemical conditions associated with saturated mine workings adjacent to the existing landfill.

• Project Manager and Project Hydrogeologist for the investigation and installation of product recovery system to mitigate groundwater impacts associated with releases from a bulk petroleum storage terminal operated by a Fortune 100 company.

• Project Hydrogeologist for three feasibility studies to permit landfills in south central and southeastern Wisconsin. Investigations included detailed geologic and hydrogeologic site descriptions and the preparation of comprehensive groundwater impact studies.

• Project Hydrogeologist for the investigation of a large appliance manufacturing operation which included the drilling and sampling of approximately sixty borings within the facility buildings. Multiple sources of soil and groundwater contamination were identified within the facility. Several source control remedial measures have been taken at the site.

• Project Hydrogeologist for the investigation of dense phase non-aqueous liquid (DNAPLs) contamination of the Wausau Water Supply NPL site RI/FS. The investigation uncovered multiple sources of chlorinated ethenes which had impacted 3 of the communities 5 municipal wells. Duties included supervision of several drilling crews and on-site mobile laboratory services, interpretation of geologic and hydrogeologic data, performing test pit excavations to characterize an abandoned dump and preparation of technical memorandum and RI reports. Liaison for agency correspondence.

• Project Hydrogeologist for the 9th Avenue Dump NPL site RI/FS. Duties included direction of drilling and sampling activities for the investigation of an uncontrolled hazardous waste dump located in Gary, Indiana. Also performed geologic and hydrogeologic assessment of site conditions including a description of the nature and extent of a wide variety of contaminants including DNAPLs. Prepared reports for agency review.

• Project Hydrogeologist for the Gallatin National Landfill in central Illinois. Investigation includes drilling and monitoring well installation totaling over 5000 lineal feet. Performed statistical analysis of background groundwater quality data from the site. Also involved in the regional groundwater flow modeling to assess the affects of development of the multiple zone of saturated landfills within a previously heavily strip mined basin. Modeled groundwater flow to evaluate the gradient control system designs.

• Project Hydrogeologist for the Investigation of the Carpentersville State Remedial Action Priority List (SRAPL) site. Directed drilling and sampling activities to define the nature and extent of VOC and PCB contamination associated with resin manufacturing operations adjacent to the Fox River. Evaluated geologic and hydrogeologic data and prepared a focused RI report identifying source control remedial actions which are in the process of being implemented at the site.

• Project Hydrogeologist for the installation of an emergency landfill gas collection system. The system was effective in reducing methane levels in adjacent homes below combustible levels within seventy-two hours of system installation.

- Project Manager and Project Hydrogeologist for numerous groundwater investigation and remediation projects associated with hydrocarbon releases from USTs or surface spills.

**PUBLICATIONS**

"Hydrogeology of the Hardy Road Sanitary Landfill, Akron, Ohio," Master Thesis, University of Akron.



**TONY A. KIEFER**

Senior Project Engineer

## EDUCATION

M.S. Geotechnical Engineering, University of Illinois, Chicago

B.S. Structural Engineering, University of Illinois, Chicago

## REGISTRATION

Professional Engineer: Illinois

## CERTIFICATION

OSHA 1910.120, 48 Hour, Hazardous Waste Training

## PROFESSIONAL ACTIVITIES

American Society of Civil Engineers

## EXPERIENCE

Senior Project Engineer responsible for management of geotechnical engineering projects, development of Cone Penetration Testing (CPT) capabilities for both geotechnical and environmental site investigations, and analysis of embankment structures under seismic loading conditions.

- Managed all aspects of fielding and operating a 20-ton CPT vehicle for in-situ measurement of soil strength and delineation of soil stratigraphy. Developed, installed and programmed a hardware and software system for acquisition, storage, analysis, and plotting of CPT data in a mobile field environment. Designed and implemented specialized equipment for water sampling, gas sampling, grouting of cone holes, and installation of piezometers.

A representative sampling of CPT projects includes the following:

Argonne National Laboratory, Argonne, Illinois - As Project Manager, developed a self-grouting cone system and mine well piezometer system capable of testing and obtaining water samples within dense glacial till at a controlled site containing radioactive waste buried in underground vaults. The CPT provided up to 3-liter water samples without generating any drilling wastes.

- Fort Loudon Dam, Loudon, Tennessee; seismic stability of foundation soils;
- Beech Dam, Lexington, Tennessee; measurement of artesian pore pressures and installation of push-type piezometers;
- Blue Ridge Dam, Blue Ridge, Georgia; pore pressure dissipation tests to determine in-situ piezometric profile of clay puddle core, CPT tests from ATV mounted drill rig on steep dam slopes for seismic stability;
- Castle Rock and Petenwell Dams, Necedah, Wisconsin; static stability and in-situ measurement of pore pressure;
- Clay Mine Landfill, Allen Park, Michigan; investigation of in-situ strength due to a major slope-stability failure;
- Evergreen Landfill, Toledo, Ohio; determined stratigraphy to locate sand layers in glacial till;
- Dominion Terminal Expansion, Newport News, Virginia; determined the strength of soil underlying railroad embankments;
- Kayo-Pontiac LUST site, Pontiac, Michigan; stratigraphy to investigate extent of contamination;
- Palisades Nuclear Power Plant, Palisades, Michigan; quality control of sand relative density after vibro-compaction;
- Bailey Power Plant, Burns Harbor, Indiana; in-situ strength of sands and soft clays for analysis of subsidence failure possibly caused by liquefaction;
- Evanston Tunnel Project, Evanston, Illinois; evaluated soft clay shear strength and residual strength;

- Performed the seismic design and analyzed the liquefaction potential of a landfill in Covington, Virginia. A SHAKE study was performed to determine the level of shaking within the paper sludge fill and fly ash and shale embankments due to a regulatory required 0.2g earthquake.

- Performed the static finite element analysis using FEADAM, the dynamic stress analysis using SHAKE, and the permanent deformation analysis using DISPLMT for the proposed Illinois Low-Level Radiation Waste Disposal Facility in Martinsville, Illinois. Reviewed site seismicity, selected earthquake motions, determined dynamic moduli from in-situ geophysical cross-hole tests, performed all analyses on PC computers, evaluated soil strength based on in-situ SPT tests, and made engineering recommendations regarding potential loss of soil strength due to a New Madrid event.

- Performed the nonlinear static and dynamic stress analyses using the computer programs FEADAM and SHAKE for five embankment dams in the National Power Grid of Iceland. Responsibilities included, determining hyperbolic soil parameters from static laboratory tests, evaluating dynamic soil moduli from field geophysical tests, selecting design earthquake motions to match site seismicity and performing the computer analysis on a PC microcomputer.

• Acted as a recurrent lecturer for a number of short courses within the disciplines of Cone Penetration Testing and dynamic analysis. Taught microcomputer based methods of seismic analysis in the course: "PC-Based Seismic Design and Analysis of Earth and Tailings Dams," held both privately and in conjunction with the University of Missouri-Rolla. Discussed state-of-the-art uses of the Cone Penetration Test for geotechnical and environmental site investigations in the courses: "In-Situ Soil Testing," "Environmental Drilling Technology," and "Hazardous Waste Site Assessment and Instrumentation" held by the University of Wisconsin-Milwaukee.

#### PUBLICATIONS

"The Cone Penetration Test for Environmental Investigations," presented at Environmental Drilling Technology short course, University of Wisconsin - Milwaukee, 1989-1992.

"Permanent Deformation Analysis of the Proposed Illinois Low-Level Radioactive Waste Disposal Facility," presented at Seismic Design and Analysis of Embankments and Tailings Dams short course, Chicago, Illinois, May 1991.

"The Cone Penetration Test for Geotechnical Investigations," presented at In-Situ Soil Testing short course, University of Wisconsin - Milwaukee, May 1990.

"Simplified Seismic Analysis of the Thjorsa and Tungna River Basin," presented at Seismic Design and Analysis of Small and Medium Embankments short course, University of Missouri - St. Louis, March 1990.

"The Cone Penetration Test - Field Lessons, Interpretation and Stratigraphy," presented at In-Situ Soil Testing short course, University of Wisconsin - Milwaukee, May 1989.

"Hyperbolic Stress-Strain Parameters for Finite Element Analysis of Dams," presented at Seismic Design and Analysis of Small and Medium Embankment Dams, short course, University of Missouri, San Diego, California, March 1989.

"Cone Penetration Testing for Geologic, Geotechnical and Environmental Investigations," Illinois Section, ASCE-AEG, Annual Meeting, January 1988.

Author of "The SHAKE System" and "The FEADAM System" microcomputer programs for static and dynamic analysis of dams and presentation of results. In use by over 150 consultants and agencies worldwide.

**ROBERT K. TWARDOCK**

Project Engineer

## EDUCATION

M.S.C.E., University of Illinois, Urbana-Champaign

B.S.C.E., University of Illinois, Urbana-Champaign

## REGISTRATION

Professional Engineer: Michigan, Illinois, Wisconsin, Ohio, Virginia

## CERTIFICATION

OSHA 1910.120 Hazardous Waste Training to Level B

Troxler Nuclear Density Meter

## PROFESSIONAL ACTIVITIES

American Society of Civil Engineers

## EXPERIENCE

Project Engineer responsible for investigations of environmental contamination, landfill design and underground storage tank removals and investigations. A representative sampling of project experience includes:

- Project Engineer for a state superfund site in southeast Michigan. Project included RI/FS, interim response work, treatability studies for the use of solidification/stabilization, and proposed remedial design and specifications. Project involved extensive regulatory interaction. Duties included field sampling, construction supervision, writing of reports, preparation of bid documents, and construction management.

- Project Manager for removal of four underground storage tanks from a vaulted sidewalk at a historic building in downtown Chicago. Project involved preparation of plans and specifications, contract negotiations, and construction management.

- Project Manager for hazardous waste cleanup in southern Indiana. Project incorporated full scope turnkey services including design and construction.

- Provided field monitoring services for remediation of several petroleum-related sites of contamination. Included are two sites where shallow bedrock increased potential for aquifer contamination.

- Project Manager for remediation of hazardous soil and groundwater using vapor extraction and air stripping. Project included permitting, design, analysis, and construction monitoring.

- Project Engineer for preliminary engineering design for proposed landfill in southwest Virginia. Proposed design accommodated unique setting of facility in former quarry by innovative uses of geosynthetics.

- Performed geotechnical analysis for design of several municipal landfills, including slope stability, settlement, basal stability and synthetic linear stability. Investigated use of interface friction tests to demonstrate linear stability.

- Project Engineer on reconstruction of failed slope in residential area. Project included design and construction of necessary drainage, benching and cover for proper stability.

- Project Engineer for two industrial wastewater discharge permit applications. Responsibilities included evaluation of analytical test results and preparation of applications.

- Project Engineer on investigation of clay soil's capacity to adsorb contamination from overlying fill soils. Investigation included cation exchange capacity, mineralogical studies and permeability interaction.

- Project Manager for environmental evaluation of sediment to be excavated in Chicago Sanitary and Ship Canal. Responsibilities included management of drilling and analytical testing, evaluation of analytical results, and preparation of final report.

- Project Engineer on several projects for investigation and analysis of vibrations in soil and structures. Performed data collection and analysis in field, aided in data interpretation using frequency analyzer, and prepared final reports.

- Project Engineer on remedial investigation for failed sewer excavation and design of alternate engineered solution. Project removed use of in-situ shear strength testing, cost comparisons, and field monitoring.

- Field Engineer for installation of micropiles in remedial action at major automotive plant in northern Indiana. Project involved underpinning, concrete restoration, structural remediation, and replacement of concrete pavements.

## PUBLICATIONS

"Expert System for the Design of Highway Bridge Foundations," Level VI Users Group Conference 1988.

# PROFESSIONAL PROFILE



**EDIE SCALA-HAMPSON**

Manager, Industrial Hygiene

## EDUCATION

B.S. Biology, Loyola University

Asbestos Project Management, 40-Hr.  
Certification, University of Illinois

Respiratory Protection-OSHA Training  
Institute, Des Plaines, Illinois

Continuing Program of Short Courses in  
Industrial Hygiene, Toxicology,  
Ventilation Design, Noise Control,  
Training, Hazard Communication

## REGISTRATION

American Board of Industrial Hygiene

Certified for Comprehensive Practice of  
Industrial Hygiene

## PROFESSIONAL ACTIVITIES

American Industrial Hygiene Association

American Society of Safety Engineers

American Insurance Services Group

AIHA Hazardous Waste Subcommittee

## EXPERIENCE

Serves as the Manager of Industrial  
Hygiene. A representative sampling of  
recent experience includes:

- Initiation and development of audit parameters for health and safety and environmental functions of a major computer company. Also coordination of national and international site visits, reviewing and monitoring records, medical surveillance programs and data, MSDS records, hazard communication programs, respiratory protection programs, emergency preparedness, and confined space entry procedures.
- Industrial hygiene consultation for a magazine and book printer where benzene was found as an impurity in a commonly used film cleaning solvent. Personal breathing zone levels were above the recommended occupational health exposure standard. Medical surveillance guidelines were developed and recommended as well as the need for immediate product substitution.
- Administration of the industrial health/hygiene training for safety professionals involved in loss control functions.
- Coordination and assistance in preparation of company policies and safe work practices where known teratogens, mutagens, or carcinogens were present in the workplace.
- Ventilation design assistance in the receiving and packaging of animal specimens preserved in formaldehyde.
- Directing the development of site specific hazard communication training programs for electroplating plants, metalgood manufacturers, furniture/wood product plants, and chemical paint facilities.
- Providing extensive industrial hygiene services involving all types of occupational health hazards both chemical and physical for a wide variety of industries.
- Participation in corporate committees on environmental conservation, hazardous materials, safety and loss prevention.
- Coordination of hearing conservation programs and development of engineering controls to reduce structure born noise. Octave band analyses of noise spectra and design of acoustic enclosures for a major book publisher.
- Interpretation of the technical aspects of occupational disease exposures that have resulted in workers compensation claims.
- Environmental risk assessment development for companies with known soil, groundwater, and surface impoundment contamination of site. Examples include: radioactive waste, benzidine based dyes, coal tar pitch volatiles, pentachlorophenol, and creosote.
- Involvement in review and formulation of computerized tracking of material safety data sheet information.



**ROGER W. NOYCE**

Manager, Subsurface Exploration

## EDUCATION

B.S., Geology, Michigan State University

## PROFESSIONAL ACTIVITIES

National Groundwater Association

Association of Groundwater Scientists and Engineers

American Institute of Professional Geologists

Environmental & Engineering Geophysical Society

Michigan Basin Geological Society

Michigan Well Drillers Association, Technical Division

## EXPERIENCE

Michigan Department of Natural Resources (MDNR) Environmental Response Division (ERD) - Chief, Geotechnical Unit, Geological Services Section.

• Supervise Hydrogeologists, Environmental Quality Analysts, and Technicians conducting geophysical and hydrogeological investigations statewide at sites of environmental contamination.

• Supervise MDNR drilling rigs on a statewide basis for installation and abandonment of soil borings and monitor wells at sites of environmental contamination.

• Vice Chairman, ERD's Consistency Committee of 307 designated Senior level signatory for Type A and Type B remediation.

• Technical representative for Act 307 implementation team.

• Member of Subcommittee on establishment of statewide metals background for Act 307.

• Technical negotiator for the State of Michigan on negotiated settlements at Superfund sites.

• Served as advisor to Division Management, Law Division, and the Attorney General on hydrogeological, geophysical and technical matters.

**Environmental Response Division, Staff Specialist, Senior Hydrogeologist for the Division.**

• Permanent member of MDNR/ERD Quality Review Board for review of Act 307 Type A and Type B RI/FS, and clean closure reviews, and Type C cleanups.

• ERD's permanent member on Geological Survey Division's Quality Review Board for review of Act 61, RI/FS, and clean closure reviews.

• Charged with statewide oversight of geotechnical, hydrogeological, geophysical, and remote sensing investigations directed by ERD.

• In charge of training and mentoring department staff in the proper use, application and interpretation of geophysical, geotechnical, remote sensing and borehole logging techniques.

• Expert witness for the State on hydrogeology, geophysics, and geotechnical techniques.

• Division's Radiation Protection Officer licensed by the Nuclear Regulatory Commission to handle the department's radioactive borehole logging sources.

**Groundwater Quality Division, Divisions Senior Hydrogeologist and Geophysicist.**

• Expert witness on geophysics and hydrogeology at court and administrative hearings.

• Coordinate and direct geophysical and hydrogeologic investigations at sites of environmental contamination.

• Responsible to research, evaluate, implement new hydrogeological and geophysical techniques and train division staff in their use.

**Resource Recovery Division, Supervisor of the Monitoring and Investigation Unit, Geology Section.**

• Supervise and coordinate groundwater contamination investigations at sites of landfill contamination.

• Supervise and coordinate quality assurance inspections at sites of Act 641 and Act 64 landfill construction.

• Division's representative on the committee charged with development of the department's quality assurance manual.

• Co-project manager in charge of the technical aspects for the design of the cap, slurry wall and groundwater purge system for the Gratiot County PBB Landfill.

• Senior technical member of the quality assurance team for the construction of the Hooker Chemical C-56 vault in Montague, Michigan.

• In charge of developing hydrogeological rules and guidance documents for Act 641.

**Michigan Department of Transportation, Testing and Research Division, Geotechnical Unit.**

• Geologist/Geophysicist in charge of conducting resistivity, seismic and drilling for materials inventory and proposed construction alignments for roadway design.

- Conduct hydrogeological investigations at sites of salt brine contamination from roadway de-icing salt storage.

- Conduct hydrogeologic environmental impact studies along proposed roadway alignments.

- In charge of the development of Testing and Research Division's Environmental Impact Statement Action Plan.

- In charge of Testing and Research Division's buried metal culverts corrosion investigation.

#### PUBLICATIONS

Iversen, W., Montgomery D. and Noyce, R.W. 1993, Verification of Soil Remediation, MDNR Draft.

Noyce, R.W. 1985, Buried Drum Investigation Cemetery Site, An Electromagnetic and Ground Penetrating Radar Investigation, Rose Township, MDNR.

Noyce, R.W. 1984, Soil & Groundwater Contamination, An Electromagnetic and Ground Penetrating Radar Investigation, Battle Creek, MDNR.

Monet, D.P. and Noyce, R.W. 1984, Soil Gas Survey, Village of Red Oak, Oscoda County, MDNR.

Monet, D.P. and Noyce, R.W. Soil Gas Survey, Village of Frederic, Crawford County, MDNR.

Curry, R.G. and Noyce, R.W., et al. 1983, Geophysical Investigation, Berlin & Farro, Liquid Incineration Site, North Sludge Lagoon, Genesee County, MDNR.

Noyce, R.W. 1982, Berlin & Farro, magnetometer Survey, Genesee County MDNR.

Noyce, R.W. 1982, Magnetic Survey, Metamore Landfill, Lapeer County, MDNR.

Montgomery, D. and Noyce, R.W., Resistivity Survey, Southwest Ottawa Landfill, Ottawa County, MDNR.

Curry, R.G. and Noyce, R.W. 1979, Brine Contamination, Village of Levering, Emmet County, MDOT.

R.W. Noyce and J.M. Ritchie, Michigan Galvanized Metal Culvert Corrosion Study; Transportation Research Record 713, 1979, pp 1-6.

R.W. Noyce, R.W. Ostrowski and J.M. Ritchie, Corrosion of Galvanized Metal Culverts, Transportation Research Record 539, 1975, pp 38-49.

Hydrogeologic Environmental Impact Statement, M-59 from US-23 East to Highland, Oakland County, MDOT.

Hydrogeologic Environmental Impact Statement, US-31 from the Mason County Line North to Hesslund Road, Mason County, MDOT.

Hydrogeologic Environmental Impact Statement, US-27 from the Jackson County Line North to M-50, Jackson County, MDOT.



**WILLIAM P. QUINN**

**Laboratory Manager**

## EDUCATION

B.S., Occupational Education, Southern Illinois University

A.A.S., Architectural and Building Construction Technology, College of Lake County

## PROFESSIONAL ACTIVITIES

American Society of Testing and Materials

## EXPERIENCE

Serves as Laboratory Manager for the Geotechnical, Materials and Geosynthetic Laboratories in the Northbrook Office. Responsibilities include overview of routine soil testing, geotextile, materials testing and special geotechnical testing laboratories, all special testing assignments, test result review, project and staff coordination, as well as equipment and test development, corporate consultant with 20 years experience in the geotechnical testing of soils. A representative sampling of major laboratory project experience includes:

- Pond liner study consisting of long-term permeability testing at elevated temperatures using corrosive permeants for Dow Chemical, Magnolia, Arkansas.
- Permeability evaluation of bentonite amended soils compaction and complete index properties analysis for the Crandon, Wisconsin Mine Waste Disposal Facility for Exxon Minerals Company.
- Long-term permeability study using a bentonite sand mixture and a hazardous permeating fluid for retention ponds in up-state New York for American Colloid Company.
- Static and dynamic triaxial testing on recompacted sand samples from the Urbanite Dam Project, Caracas, Venezuela for Harza Engineering Company.

- Coordinated laboratory testing which included hydraulic conductivity and clay liner and structure conformance, as well as membrane and geosynthetic testing for leachate collection systems and retention ponds for the Gallatin National Landfill in Fairview, Illinois.

- Permeability and triaxial compression tests on molded specimens of varying bentonite and cement mixtures for a plastic diaphragm wall at LaGrande Reservoir, Jones Bay, Canada for Bencor-Petrifond.

- Triaxial, consolidation, permeability, compaction, laboratory vane shear, pinhole dispersion and index testing for the Upper Salt Creek Floodwater Retention System in Palatine, Illinois for the MSDGC.

- Conducted 12-inch diameter triaxial tests on recompacted crushed rock specimens for a slope stability study at the El Cerrejon Coal Project in Columbia, South America for Morrison-Knudsen Company.

- Consolidated drained rock triaxial, specific gravity, bulk density, and Poisson's ratio testing of coral rock from the Yanbu industrial complex in Saudi Arabia.

- Laboratory analysis of varved clay utilizing triaxial and residual direct shear tests for stream diversion project in Kaukauna, Wisconsin for Thilmany Pulp & Paper Company.

- Performed over 50 3-point triaxial tests in a 3 month period including direct shear and complete indexing of all samples for the reanalysis of earth dams along the Ohio River for the U.S. Army Corps of Engineers.

- Consolidated, unconsolidated and drained triaxial tests, permeability, consolidation, compaction and index testing including detailed visual classification covering all 14 items of ASTM D-2488 and photographing of each sample. Testing included on-site laboratory set-up to test non-releasable radioactive samples at the Kerr-McGee Chemical Corporation, West Chicago project for Kerr-McGee Chemical Corp.

- Large diameter permeability tests, compaction tests and index tests on Bentonite modified soils at the Crandon Mine Waste Disposal facility in Crandon, Wisconsin for Exxon Minerals Company.

- Product evaluation of a linear material (Enviromat) including triaxial tests, permeability tests, freeze-thaw, wet dry and slip-plane testing for International Minerals and Chemical Corporation.

- Product evaluation of waterproofing product (Volclay Panel) for swell potential permeability wet-dry freeze-thaw testing and slip-plane testing for American Colloid Company.

- Consolidated and unconsolidated triaxial tests and earth pressure at Rest triaxial tests (Ko), direct shear tests, and index testing at the Hackensack Landfill Site in Hackensack, New Jersey for Hackensack Meadowland Developer Commission.

- Static and dynamic testing for the Tonen Tank Farm Project located in Tokyo, Japan for Geocomp Corp.

- Performance of CIU CAU and UU triaxial tests which included the measurement of negative pore pressures on remolded and in-situ soil samples for the Kansas Power and Light Co., Topeka, Kansas.

- Performance of CIU UU and stress path triaxial testing including negative pore pressure measurement for the Browning Ferris Landfill site located in Winthrop Harbor, Illinois.
- Performance of large scale pullout tests for the FHWA Research Study of Geotextiles in Algonquin, Illinois.
- Geomembrane seam destructive testing as well as conformance testing involving tensile properties, tear properties, thickness determination and dimensional stability of membrane for landfill use. BFI Landfills in Arbor Hills, Allis Park, and Venice Park, Michigan.
- Pullout resistance testing on various geogrids for the Federal Highway Commission Study.
- Performance of constant stress pullout tests for researching product development for Tensar Corporation.
- Performance of constant pore pressure triaxial tests for critical void ratio determination as well as constrained modules testing on granular material for the NIPSCO Bailly Generating Station located in Gary, Indiana.
- Interface friction testing on 12"x12" membrane specimens for Rust Infrastructure using geomembrane and clay interfaces.
- Permeability, triaxial, consolidation and index testing for the Gallatin National landfill located in central Illinois.
- Performance of index, testing time of set tests, compaction and compressive strength tests on load contaminated soils for the Corps of Engineers Retortion Reservoir, Northbrook, Illinois.
- Long term creep testing on geogrids for Conwed Inc. product evaluation.
- Wide width tensile tests for product evaluation for Georgia Pacific.





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**JACK LEHTINEN**

Master Driller

## SPECIAL SKILLS

Troxler Nuclear Testing

Heavy Equipment Operator

CERCLA Hazardous Waste Training

Certified Well Driller

## EXPERIENCE

Served as Master Driller responsible for horizontal, vertical and angle coring for the instrumentation research project for the Chicago Deep Tunnel Project utilizing a Longyear 65 drill modified to perform at any angle and in air powered skid rig. Performed large diameter over-coring of instrumented pilot holes with instrumentation leads extending through the drill spindle.

- Field supervisor and master driller responsible for implementing the drilling program on five hydroelectric dam projects. These dams were Ada Dam, Morrow Dam, Dresden Island Dam, Brandon Road Dam and AuSable Dam. These projects included barge drilled borings, electric skid rig borings, gas skid rig borings, and all-terrain vehicle borings.

- Master Driller in charge of the drilling programs for many downtown Chicago projects involving caisson and rock coring. Some of these projects include: Sears Tower, Orchestra Hall, Time Life Building, Chicago Union Station, Chicago Northwestern Railroad, Chicago Art Institute, NBC Building, Chicago Tribune, John Hancock Building, 10 South LaSalle and the Merchandise Mart.

- Performed special testing and sampling for the Corps of Engineers on the Chicago River dredging project. This project involved barge work, Osterberg sampling procedures and precision depth location for sampling.

- Performed large diameter rock coring to a depth of 100 feet for a Corps of Engineers replacement lock and dam on the Illinois River.

- Responsible for drilling numerous major geotechnical projects in the Chicago area.

- Field coordinator for Iowa project on the Cedar River. Performed vertical and horizontal 4 inch cores of railroad bridge piers from working platform and barges using gas powered skid rigs and Truco portable drills.

- Provided expertise in coring caissons at Chicago Union Station. This involved angle coring of an 80 foot deep existing caisson which had to avoid rail grillage at the top and yet, not exit the caisson prior to recovering the concrete-rock interface.

- Drilled and cored highly weathered concrete with 95% recovery on a CSX Railroad bridge pier with concrete-rock interface with railroad track mounted drill rig.

- Performed deep borings for Racine Harbor, Racine, Wisconsin utilizing barges and gas skid rig. Difficult project due to drilling through riprap, but was able to complete project ahead of schedule and under budget.

- Responsible for probing and locating Chicago's underground freight tunnels in the flood emergency in April, 1992.

- Performed deep borings for the IDS Center in Minneapolis. Borings involved drilling in 40 feet of cobble and boulder material before core drilling of underlying limestone and poorly cemented sandstone, under extremely cold, winter-time conditions.

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**DONALD C. JOHNSTON JR.**

Project Geologist

## EDUCATION

B.A. Geology, University of Minnesota

## EXPERIENCE

Serves as supervisor and manager of the Subsurface Exploration Department of the Minneapolis office. Responsible for quality control and management of the drilling operations. Also serves as an Environmental Project Geologist with responsibilities for monitoring well installation, well development, groundwater level surveys, soil and bedrock classifications. Responsible for performing specialized sampling and in-situ testing for soil and bedrock. Experience includes diamond core drilling, pressuremeter testing, vane shear, standard penetration, torvane and penetrometer. Project experience includes:

- Project geologist, drilling supervisor and site safety officer for sampling and testing of radiologically contaminated soil at Kerr McGee Plant in West Chicago, Illinois.
- Environmental geologist for the Twin Cities Army Ammunition Plant in New Brighton, Minnesota. Duties include supervision of drilling operations and well installations, classification of soils and bedrock, groundwater monitoring program and groundwater sampling.

- Perform site investigation, including soil sampling, monitoring well installations and piezometer placement for the Hercules Plant, Salt Lake City, Utah. Conduct hydrogeologic evaluation for this multi-aquifer site.

- Field geologist for the U.S. Army Corps of Engineers, responsible for conducting geologic investigations and subsurface exploration for dams and waterways throughout the Upper Midwest. Responsible for the installation and monitoring of slope inclinometers, piezometers, and monitoring wells.

- Design and implementation of sediment collection program in northeast Minnesota for the Department of Natural Resources. Duties included sediment sampling and testing for pH, EH, temperature, composition and texture.



November 23, 1993

Doug Abernathy  
STS Consultants  
111 Pfingsten Road  
Northbrook, Illinois 60062

Dear Mr. Abernathy:

I am sending for your review the documents we discussed during our telephone conversation of November 22, 1993. Enclosed are the:

ITAS-Quality Assurance Management Plan,

Oak Ridge and Knoxville Laboratory Appendices,

ITAS-Oak Ridge Laboratory Standard Operating Procedures for the analysis of Radium-226/228 and Alpha-Emitting Isotopes (isotopes of uranium, thorium, plutonium, americium, neptunium),

Results of EPA Radiochemical Intercomparison Study Program for Radium, Uranium and Plutonium (our laboratory code is MS), and

Resumes for our key personnel.

You should be receiving under separate cover EPA performance evaluation program results for the Knoxville laboratory and resumes of key personnel for that facility.

If there is any other information you need please do not hesitate to call. We hope we can be of service to you in the future.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Leah K. Rawlins'.

Leah K. Rawlins  
Quality Control Coordinator

cc: Jackie Waddell  
QA file

# **Operation-Specific**

## **Quality Assurance Management Plan**

### **IT ANALYTICAL SERVICES DIVISION**

*Revision 0*

*September 1, 1993*

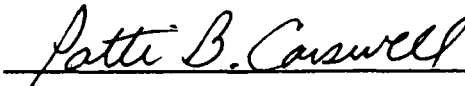
**Operation-Specific  
QUALITY ASSURANCE MANAGEMENT PLAN  
IT ANALYTICAL SERVICES DIVISION**

**OAK RIDGE LABORATORY**

Prepared by:

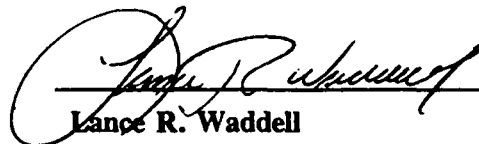


**Leah K. Rawlins**  
QA/QC Coordinator  
Oak Ridge Laboratory  
IT Analytical Services

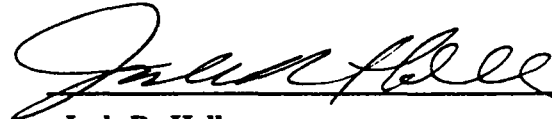


**Patti B. Carswell**  
Analytical Project Coordinator  
Field Analytical Services - East  
IT Analytical Services

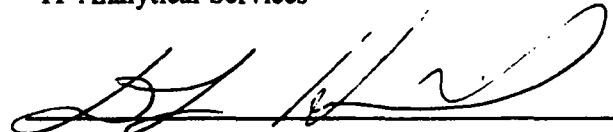
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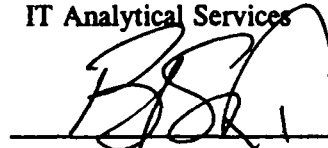
**Lance R. Waddell**  
Laboratory Director  
Oak Ridge Laboratory  
IT Analytical Services



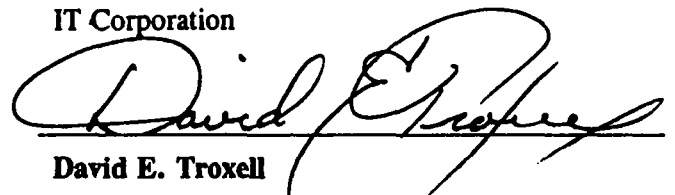
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## ***LIST OF ACRONYMS***

|         |   |
|---------|---|
| AA      | Atomic Absorption                               |
| ANSI    | American National Standards Institute           |
| AR/COC  | Analysis Request/Chain-of-Custody               |
| AS      | Analytical Spike                                |
| ASTM    | American Society for Testing and Materials      |
| BFB     | Bromofluorobenzene                              |
| BLK     | Blank   |
| BS      | Blank Spike                                     |
| BSD     | Blank Spike Duplicate                           |
| CCC     | Continuing Calibration Compounds                |
| CCS     | Continuing Calibration Standard                 |
| CEO     | Chief Executive Officer                         |
| CF      | Calibration Factor                              |
| CHP     | Chemical Hygiene Plan                           |
| CLP     | Contract Laboratory Program                     |
| COC     | Chain-of-Custody                                |
| CRDL    | Contract Required Detection Limit               |
| CRQL    | Contract Required Quantitation Limit            |
| CS      | Check Standard                                  |
| CUR     | Condition Upon Receipt                          |
| CVAA    | Cold Vapor Atomic Absorption                    |
| DFTPP   | Decafluorotriphenylphosphine                    |
| DOC     | Dissolved Organic Carbon                        |
| DOT     | Department of Transportation                    |
| DQO     | Data Quality Objective                          |
| DRC     | Data Review Checklist                           |
| EDT     | Electronic Data Transfer                        |
| EMSL-LV | Environmental Monitoring Laboratory-Las Vegas   |
| EPA     | U. S. Environmental Protection Agency           |
| FAS     | Field Analytical Services                       |
| FB      | Field Blank                                     |
| FD      | Field Duplicate                                 |
| GC      | Gas Chromatography                              |
| GC/MS   | Gas Chromatography/Mass Spectrometry            |
| GFAA    | Graphite Furnace Atomic Absorption Spectroscopy |
| HDPE    | High Density Polyethylene                       |
| HPLC    | High Performance Liquid Chromatography          |
| HRGC    | High Resolution Gas Chromatography              |
| HRMS    | High Resolution Mass Spectrometry               |

### ***LIST OF ACRONYMS (continued)***

|         |   |
|---------|---|
| HTV     | Holding Time Violation                                |
| IATA    | International Air Transportation Association          |
| ICAO    | International Civil Aviation Organization             |
| ICP     | Inductively Coupled Argon Plasma Spectroscopy         |
| ID      | Identification  |
| IR      | Infrared Spectroscopy                                 |
| IS      | Internal Standard                                     |
| ISO     | International Standard Organization                   |
| IT      | IT Corporation  |
| ITAS    | IT Analytical Services                                |
| JPR     | Job Performance Review                                |
| LCL     | Lower Control Limit                                   |
| LCS     | Laboratory Control Sample                             |
| LIMS    | Laboratory Information Management System              |
| LRMS    | Low Resolution Gas Chromatography                     |
| LST     | Laboratory Safety Training                            |
| LWL     | Lower Warning Limit                                   |
| MB      | Method Blank  |
| MBAS    | Methylene Blue Active Substance                       |
| MDA     | Minimum Detectable Activity                           |
| MDL     | Method Detection Limit                                |
| MOP     | Manual of Practice                                    |
| MS      | Matrix Spike  |
| MSA     | Method of Standard Additions                          |
| MSD     | Matrix Spike Duplicate                                |
| MSDS    | Material Safety Data Sheet                            |
| NBS     | National Bureau of Standards                          |
| NCM     | Nonconformance Memo                                   |
| ND      | Not Detected  |
| NIOSH   | National Institute for Occupational Safety and Health |
| NIST    | National Institute of Standards Technology            |
| NMOC    | Non-Methane Organic Compounds                         |
| NPDES   | National Pollutant Discharge Elimination System       |
| NRC     | Nuclear Regulatory Commission                         |
| OS-QAMP | Operation-Specific Quality Assurance Management Plan  |
| PAH     | Polynuclear Aromatic Hydrocarbons (or PNA)            |
| PCB     | Polychlorinated Biphenyls                             |
| PE      | Performance Evaluation                                |
| PPE     | Personal Protective Equipment                         |
| PQL     | Practical Quantitation Limit                          |

### ***LIST OF ACRONYMS (continued)***

|        |   |
|--------|---|
| PUF    | Polyurethane Foam                             |
| QA     | Quality Assurance                             |
| QAMP   | Quality Assurance Management Plan             |
| QAPjP  | Quality Assurance Project Plan                |
| QAPP   | Quality Assurance Program Plan                |
| QA/QC  | Quality Assurance/Quality Control             |
| QA/QCC | Quality Assurance/Quality Control Coordinator |
| QAS    | Quality Assurance Summary                     |
| QC     | Quality Control                               |
| RB     | Reagent Blank                                 |
| RCRA   | Resource Conservation Recovery Act            |
| RF     | Response Factor                               |
| RPD    | Relative Percent Difference                   |
| RRF    | Relative Response Factor                      |
| RSD    | Relative Standard Deviation                   |
| RSO    | Radiation Safety Officer                      |
| SDG    | Sample Delivery Group                         |
| SOP    | Standard Operating Procedure                  |
| SPCC   | System Performance Check Compounds            |
| SRM    | Standard Reference Material                   |
| SS     | Surrogate Standard                            |
| TAT    | Turnaround Time                               |
| TB     | Trip Blank                                    |
| TCLP   | Toxicity Characteristic Leaching Procedure    |
| TKN    | Total Kjeldahl Nitrogen                       |
| TOC    | Total Organic Carbon                          |
| TOX    | Total Organic Halogens                        |
| TQM    | Total Quality Management                      |
| UCL    | Upper Control Limit                           |
| UN     | United Nations                                |
| USEPA  | United States Environmental Protection Agency |
| UWL    | Upper Warning Limit                           |
| VOA    | Volatile Organic Analytes                     |
| VOST   | Volatile Organic Sampling Train               |
| WS     | Water Supply                                  |
| WP     | Water Pollution                               |



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